REMARKS

Claims 1 to 25 and 34 are in the case.

The non-elected claims 26 to 33 have been cancelled without prejudice to Applicant's right to pursue such claims. The cancellation does not affect the inventorship in this application.

Specification

In response to the requirement, the paragraph bridging pages 6 and 7 has been corrected to replace the erroneous periods by commas. The instances identified appear to be the only instances of such errors in the specification. The amendment made satisfies the requirement.

Claim Objections

Claim 6 has been corrected to replace the erroneous period by a comma. This satisfies the requirement.

Claim Rejections – 35 USC 112

Claims 1, 6 to 11, 14 to 25 and 34 are rejected under 35 USC 112.

The claims have been amended in response to the rejection. While some of the language employed in the claims may appear "awkward", it nevertheless reflects what is intended.

Formula A in claim 1 covers six very closely related classes of compound; phosphines, corresponding phosphonium salts, diphosphines, bisphosphines and corresponding diphosphonium and bisphosphonium salts.

When t is 0, the compound A is either a phosphine or a phosphonium salt of a phosphine. When t is 1, compound A is a diphosphine, a bisphosphine, a diphosphonium or a bisphosphonium salt.

Y_1 and Y_2 are both absent from the phosphines, diphosphines and bisphosphines.

Applicant made its selections from the choices offered; Applicant elected the embodiment in which Y_1 and Y_2 are present but when t is 0. As the Examiner recognizes, this necessarily results in Y_2 not being present because the whole radical ($PR_4R_5Y_2$) will be absent when t is 0. Effectively, Applicant has elected the species phosphines and corresponding phosphonium salts for examination, whereby the diphosphines, the bisphosphines, the diphosphonium and the bisphosphonium salts are the non-elected species.

Claim 1 has been amended to avoid the "awkward" language to now more accurately recite that when y, n, z and m are all 0, then Y_1, Y_2 and X are absent.

Claim 1 has further been amended so that instead of specifying values when Y_1 and Y_2 are present, the same values are specified for when X is present.

It will be recognized that X is present in the phosphonium salts, the diphosphonium and bisphosphonium salts, but is not present in the phosphines, diphosphines and bisphosphines.

It is believed that the amendment will enable the Examiner to better determine the metes and bounds of patent protection desired although it is believed that these metes and bounds were previously defined even if in a perhaps "awkward" manner.

In addition to the amendments in claim 1, claims 6, 7 and 9 have been amended to delete the redundant language "Y_1 and Y_2 are present". Since Y_1 and Y_2 are defined in claims 6, 7 and 9, it is redundant to specify that they are present.

It is believed that the amendments overcome the objection under 35 USC 112.

Claim Rejections 35 USC 102

It is indicated that claims 1, 6 to 9, 14, 21 and 23 to 25 are anticipated by Salzburger et al US 5,607,544.

The Invention

The present invention is concerned with a method of bleaching and brightness stabilization of a lignocellulosic material. The agent that is employed for the bleaching and brightness stabilization is a water-soluble phosphine or phosphonium compound of formula A. Claim 1 has been amended for greater clarity to recite the step of "bleaching" the lignocellulosic material with the water-soluble phosphine or phosphonium compound of formula A, and to recite the step of "stabilizing the brightness" in the resulting bleached cellulosic material with the compound of formula A.

This is clearly what is described in the specification, for example, at page 9, lines 7 to 11 and in definitions iv) and v) at pages 18 to 19.

Bleaching of a lignocellulosic material with the water-soluble phosphine or phosphonium compound of formula A and stabilization of the resulting brightness with such compound of formula A is **not** described in the prior art.

US 5,607,544 Salzburger et al

Salzburger et al describes bleaching of wood pulp or deinking waste paper employing hydrogen peroxide in the presence of a stabilizing agent. The "stabilizing" of Salzburger et al is stabilization of the hydrogen peroxide bleaching agent. There is no suggestion in Salzburger et al that his stabilizing agent stabilizes the brightness of lignocellulosic material.

The term "stabilizing" and the stabilizing effect in Salzburger et al refers to the stabilization of hydrogen peroxide against bacteria-induced decomposition. The term "stabilizing" and the stabilizing effect described and claimed in the present invention refers to the stabilization of lignocellulosic materials against light or heat-induced brightness loss of the materials.

The bleaching method described by Salzburger et al is accomplished by treating the wood pulp with **hydrogen peroxide** and a hydrogen peroxide stabilizing agent. Paraclox is shown to be the most effective "stabilizing agent" (i.e. agent that provides the most stabilization

against bacterial-induced hydrogen peroxide decomposition) (col. 4, lines 32-34) and is specifically claimed.

In the Office Action, reference is made to column 4, lines 32-34. The Table at column 4 in Example 1 is evidently provided to demonstrate the effectiveness of Paraclox in the stabilization of hydrogen peroxide against bacteria-induced decomposition of the hydrogen peroxide. In the Table at column 4 in Example 1 of Salzburger et al, stabilization results are provided with respect to different concentrations of Paraclox as compared with other agents, and as compared with a comparison in which no agent is employed. The test employed depends on pressure development as a result of decomposition of the hydrogen peroxide by the bacteria to produce gases such as oxygen (which in a closed vessel will result in an increase in pressure).

It can be seen from the results that in the case of Paraclox, stabilization was achieved even with very low concentrations of the Paraclox. When no agent at all was employed, and thus where no stabilization was carried out, the value was 9.8. Among the comparison materials employed to demonstrate the effectiveness of Paraclox in the Table is THPS, as noted in the Office Action. The value achieved with THPS is >9.0, which is essentially the same as or inferior to having no agent at all.

Whether THPS is capable of stabilizing hydrogen peroxide against bacteria-induced decomposition at all is very doubtful from the data shown in col. 4, lines 26-39. Note that the lower the pressure in relative units (mV) shown in col. 4, lines 26-39, the more effective the hydrogen peroxide stabilizing ability of the agent, and that without any agent/additive, the pressure is 9.8, with 400 ppm Paraclox, the pressure is 0.2, and with 400 ppm THPS, the pressure is **>9.0**.

Most importantly, **there is no example showing that THPS by itself is capable of bleaching wood pulp, nor is there any teaching of a bleaching action of THPS** in Salzburger et al. The statement (the key reason for rejecting the claims) that "Salzburger discloses a method of bleaching and brightness stabilization of a lignocellulosic material

(col. 1, lines 8-11) comprising treating the lignocellulosic material with tetrakishydroxymethylphosphonium sulphate (THPS; col. 4, lines 32-34)" is not correct.

Salzburger et al teaches bleaching with hydrogen peroxide and stabilizing the hydrogen peroxide against decomposition resulting from bacteria, employing a stabilization agent which is Paraclox. While not relevant to the present invention, Salzburger et al would appear to teach that THPS is not suitable for stabilizing hydrogen peroxide against bacterial decomposition.

As such, it should be evident that there is no teaching of the present invention in Salzburger et al and the amendment made in claim 1 serves to more clearly establish the distinction. As such, claim 1 and all claims which depend from it, fully distinguish over Salzburger et al. Favourable reconsideration is requested.

Claim Rejections – 35 USC 103

Claims 10, 11, 15 and 22 are rejected as being unpatentable over Salzburger et al in view of Bowdery WO 01/53602.

As indicated above, all claims clearly distinguish over Salzburger et al which is concerned with a completely different method employing completely different agents.

Since Salzburger et al is concerned with a completely different method, nothing in Bowdery can overcome the deficiencies of Salzburger et al.

Furthermore, the teaching of the secondary reference (Bowdery) is very similar to the teaching of Salzburger et al in that both are concerned with prevention of bacteria-induced hydrogen peroxide decomposition in the bleaching of wood pulp. The only significant difference is that Salzburger et al teaches the bleaching of the pulp with hydrogen peroxide and the hydrogen peroxide stabilizing agent in a bacteria-rich medium while Bowdery teaches pretreating a bacteria-rich medium/pulping liquor with THPS (or THP) before such a medium is used for the bleaching of the pulp with hydrogen peroxide. **The bleaching of the**

pulp disclosed in Salzburger et al and in Bowdery is accomplished by the action of hydrogen peroxide. Neither of these two prior art references nor the combination of them teaches any bleaching ability of THPS or THP.

The present invention is concerned with the use of a class of compounds which includes THPS and THP to **bleach** pulps and papers, and to stabilize the brightness achieved by such bleaching. This is certainly not taught in Salzburger et al or in Bowdery, either individually or collectively. In the light of the foregoing, it is requested that the rejection based on the combination of Salzburger et al and Bowdery be withdrawn. Both of these references are concerned with the problem of bacterial decomposition of hydrogen peroxide when it is employed as a bleaching agent. This has no relevance to the present invention.

Claims 16 to 20 and 34 are rejected as being unpatentable over Salzburger et al and further in view of Liebergott et al (US 4,804,440).

Salzburger et al has been considered above and is concerned with a different art and a different problem, namely, hydrogen peroxide bleaching in a bacterial environment.

Liebergott et al merely discloses what are conventional bleaching operations as acknowledged in the present specification, as well as the nature of the lignocellulosic materials.

It is a feature of the present invention that the bleaching achieved with the compound of formula A, and the resultant brightness stabilization, can be employed in conjunction with conventional bleaching. For example, a pulp may first be bleached with the phosphorus or phosphonium compound in accordance with the present invention and the resulting pulp may then be further bleached with standard bleaching systems based on peroxide, dithionite, oxygen or chlorine dioxide, or with a combination of these. Likewise, the bleaching in accordance with the invention may be carried out on a material which has been subjected to preliminary bleaching using such conventional bleaching systems. The reading of Salzburger et al and Liebergott et al does not result in the methods of claims 16 to 20 and 34, particularly

for the reason that Salzburger et al does not teach bleaching with a phosphine or phosphonium compound of formula A required by the present invention. Salzburger et al, like Liebergott et al, employs peroxide bleaching, but Salzburger et al directs his attention to the problem of hydrogen peroxide decomposition as a result of a bacterial environment. Salzburger et al is directed to overcoming this problem by stabilizing the peroxide against bacterial decomposition.

As such, applying the bleaching of Salzburger et al as a last stage in the bleaching of Liebergott et al does not result in the method of claims 16 to 20 and 34. Rather, it results in a completely different method. Neither of these references in any way suggests that the phosphine and phosphonium compounds a) employed in the present invention will function to bleach pulp and stabilize the brightness of the bleached pulp.

In the light of the foregoing, withdrawal of the objection under 35 USC 103 is requested.

The prior art made of record has been considered but the claims are believed to fully distinguish thereover and it is believed that the Examiner already recognizes this.

It is believed that the application is now in condition for allowance and early and favourable action would be appreciated.

Respectfully,
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